CTESTAR™ Course Curriculum Cross-Walk by Task

Pathway

Course
Work Keys Task List

Instructor
Region 25, Wayne RESA CTE

Number
WorkKeys

Host School

READING FOR INFORMATION

Level 3

1	Identify main ideas and clearly stated details.
2	Choose the correct meaning of a word that is clearly defined in the reading.
3	Choose the correct meaning of common, everyday workplace words.
4	Choose when to perform each step in a short series of steps.
5	Apply instructions to a situation that is the same as the one in the reading materials.

Level 4

6	Identify important details that may not be clearly stated.
7	Use the reading material to figure out the meaning of words that are not defined.
8	Apply instructions with several steps to a situation that is the same as the situation in the reading materials.
9	Choose what to do when changing conditions call for a different action (follow directions that include "if-then" statements).

Level 5

10	Figure out the correct meaning of a word based on how the word is used.
11	Identify the correct meaning of an acronym that is defined in the document.
12	Identify the paraphrased definition of a technical term or jargon that is defined in the document.
13	Apply technical terms and jargon and relate them to stated situations.
14	Apply straightforward instructions to a new situation that is similar to the one described in the material.
15	Apply complex instructions that include conditionals to situations described in the materials.

Level 6

16	Identify implied details.
17	Use technical terms and jargon in new situations.
18	Figure out the less common meaning of a word based on the context.
19	Apply complicated instructions to new situations.
20	Figure out the principles behind policies, rules, and procedures.
21	Apply general principles from the materials to similar and new situations.
22	Explain the rationale behind a procedure, policy, or communication.

Level 7

23	Figure out the definitions of difficult, uncommon words based on how they are used.
24	Figure out the meaning of jargon or technical terms based on how they are used.
25	Figure out the general principles behind policies and apply them to situations that are quite different from any described in the materials.

APPLIED MATHEMATICS

Level 3

26	Solve problems that require a single type of mathematics operation (addition, subtraction, multiplication, and division) using whole numbers.	
	N.MR.00.09	Record mathematical thinking by writing simple addition and subtraction sentences, e.g., 7 + 2 = 9, 10 - 8 = 2.
	N.MR.01.10	Model addition and subtraction for numbers through 30 for a given contextual situation using objects or pictures; explain in words; record using numbers and symbols; solve.

N.MR.01.11	Understand the inverse relationship between addition and subtraction, e.g., subtraction "undoes" addition: if 3 + 5 = 8, we know that 8 - 3 = 5 and 8 - 5 = 3; recognize that some problems involving combining, "taking away," or comparing can be solved by either operation.
N.FL.01.12	Know all the addition facts up to 10 + 10, and solve the related subtraction problems fluently.
N.MR.01.13	Apply knowledge of fact families to solve simple open sentences for addition and subtraction, such as: _ + 2 = 7 and 10 - _ = 6.
M.PS.01.08	Solve one-step word problems using addition and subtraction of length, money and time, including "how much more/less", without mixing units.
N.FL.02.06	Decompose 100 into addition pairs, e.g., 99 + 1, 98 + 2…
N.MR.02.08	Find missing values in open sentences, e.g., 42 + _ = 57; use relationship between addition and subtraction.
N.MR.02.09	Given a contextual situation that involves addition and subtraction using numbers through 99: model using objects or pictures; explain in words; record using numbers and symbols; solve.
N.MR.02.13	Understand multiplication as the result of counting the total number of objects in a set of equal groups, e.g., 3 x 5 gives the number of objects in 3 groups of 5 objects, or 3 x 5 = 5 + 5 + 5 = 15.
N.MR.02.14	Represent multiplication using area and array models.
N.MR.02.15	Understand division (÷) as another way of expressing multiplication, using fact families within the 5 x 5 multiplication table; emphasize that division "undoes" multiplication, e.g., 2 x 3 = 6 can be rewritten as 6 ÷ 2 = 3 or 6 ÷ 3 = 2.
N.FL.03.06	Add and subtract fluently two numbers through 999 with regrouping and through 9,999 without regrouping.
N.FL.03.07	Estimate the sum and difference of two numbers with three digits (sums up to 1,000), and judge reasonableness of estimates.
N.FL.03.08	Use mental strategies to fluently add and subtract two-digit numbers.
N.MR.03.09	Use multiplication and division fact families to understand the inverse relationship of these two operations, e.g., because 3 x 8 = 24, we know that 24 ÷ 8 = 3 or 24 ÷ 3 = 8; express a multiplication statement as an equivalent division statement.
N.MR.03.10	Recognize situations that can be solved using multiplication and division including finding "How many groups?" and "How many in a group?" and write mathematical statements to represent those situations.
N.FL.03.11	Find products fluently up to 10 x 10; find related quotients using multiplication and division relationships.
N.MR.03.12	Find solutions to open sentences, such as 7 x _ = 42 or 12 ÷ _ = 4, using the inverse relationship between multiplication and division.
N.MR.03.14	Solve division problems involving remainders, viewing the remainder as the "number left over"; interpret based on problem context, e.g. , when we have 25 children with 4 children per group then there are 6 groups with 1 child left over.
N.MR.03.15	Given problems that use any one of the four operations with appropriate numbers, represent with objects, words (including "product" and "quotient"), and mathematical statements; solve.
N.FL.04.08	Add and subtract whole numbers fluently.
N.FL.04.10	Multiply fluently any whole number by a one-digit number and a three-digit number by a two-digit number; for a two-digit by one-digit multiplication use distributive property to develop meaning for the algorithm.
N.MR.04.13	Use the relationship between multiplication and division to simplify computations and check results.
N.MR.04.14	Solve contextual problems involving whole number multiplication and division.
N.MR.04.31	For problems that use addition and subtraction of decimals through hundredths, represent with mathematical statements and solve.
N.FL.04.34	Estimate the answers to calculations involving addition, subtraction, or multiplication.
N.MR.05.02	Relate division of whole numbers with remainders to the form a = bq + r, e.g., 34 ÷ 5 = 6 r 4, so 5 • 6 + 4 = 34; note remainder (4) is less than divisor (5).

	N.FL.05.05	Solve applied problems involving multiplication and division of whole numbers.
	N.ME.05.10	Understand a fraction as a statement of division, e.g., 2 ÷ 3 = 2/3 , using simple fractions and pictures to represent.
	A.PA.07.11	Understand and use basic properties of real numbers: additive and multiplicative identities, additive and multiplicative inverses, commutativity, associativity, and the distributive property of multiplication over addition.
27	Add or subtract negative numbers.	
	N.FL.06.09	Add and multiply integers between -10 and 10; subtract and divide integers using the related facts. Use the number line and chip models for addition and subtraction.
	N.ME.06.17	Locate negative rational numbers (including integers) on the number line; know that numbers and their negatives add to 0, and are on opposite sides and at equal distance from 0 on a number line.
	N.ME.06.18	Understand that rational numbers are quotients of integers (non zero denominators), e.g., a rational number is either a fraction or a negative fraction.
	N.ME.06.19	Understand that 0 is an integer that is neither negative nor positive.
	N.FL.07.07	Solve problems involving operations with integers.
	N.FL.07.08	Add, subtract, multiply, and divide positive and negative rational numbers fluently.
28	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages.	
	N.ME.03.16	Understand that fractions may represent a portion of a whole unit that has been partitioned into parts of equal area or length; use the terms “numerator” and “denominator.”
	N.ME.03.17	Recognize, name, and use equivalent fractions with denominators 2, 4, and 8, using strips as area models.
	N.ME.03.19	Understand that any fraction can be written as a sum of unit fractions, e.g., 3/4 = 1/4 + 1/4 + 1/4.
	N.ME.03.21	Understand and relate decimal fractions to fractional parts of a dollar, e.g., 1/2 dollar = $0.50; 1/4 dollar = $0.25.
	N.MR.04.22	Locate fractions with denominators of 12 or less on the number line; include mixed numbers.
	M.PS.05.10	Solve applied problems about the volumes of rectangular prisms using multiplication and division and using the appropriate units.
29	Convert simple money and time units (e.g., hours to minutes).	
	M.UN.01.06	Tell the amount of money: in cents up to $1, in dollars up to $100. Use the symbols $ and ¢.
	M.PS.01.07	Add and subtract money in dollars only or in cents only.
	M.PS.01.08	Solve one-step word problems using addition and subtraction of length, money and time, including “how much more/less”, without mixing units.
	M.UN.03.02	Measure in mixed units within the same measurement system for length, weight, and time: feet and inches, meters and centimeters, kilograms and grams, pounds and ounces, liters and milliliters, hours and minutes, minutes and seconds, years and months.
	M.UN.05.04	Convert measurements of length, weight, area, volume, and time within a given system using easily manipulated numbers.
	N.MR.07.04	Convert ratio quantities between different systems of units, such as feet per second to miles per hour.
Level 4		
30	Solve problems that require one or two operations.	
	M.PS.03.12	Solve applied problems involving money, length, and time.
	M.PS.03.13	Solve contextual problems about perimeters of rectangles and areas of rectangular regions.
	D.RE.03.03	Solve problems using information in bar graphs, including comparison of bar graphs.
	N.FL.04.12	Find the value of the unknowns in equations such as a ÷ 10 = 25; 125 ÷ b = 25.
	N.MR.04.14	Solve contextual problems involving whole number multiplication and division.
	N.MR.04.29	Find the value of an unknown in equations such as 1/8 + x = 5/8 or 3/4 - y = 1/2.
	M.PS.04.11	Solve contextual problems about surface area.

D.RE.04.03	Solve problems using data presented in tables and bar graphs, e.g., compare data represented in two bar graphs and read bar graphs showing two data sets.
N.FL.05.05	Solve applied problems involving multiplication and division of whole numbers.
N.FL.05.20	Solve applied problems involving fractions and decimals; include rounding of answers and checking reasonableness.
N.MR.05.21	Solve for the unknown in equations such as 1/4 + x = 7/12 .
M.PS.05.10	Solve applied problems about the volumes of rectangular prisms using multiplication and division and using the appropriate units.
D.AN.05.04	Solve multi-step problems involving means.
N.MR.06.03	Solve for the unknown in equations such as 1/4 ÷ _ = 1, 3/4 ÷ _ = 1/4 , and 1/2 = 1 • _ .
N.MR.06.13	Solve contextual problems involving percentages such as sales taxes and tips.
N.FL.06.15	Solve applied problems that use the four operations with appropriate decimal numbers.
A.PA.06.01	Solve applied problems involving rates, including speed, e.g., if a car is going 50 mph, how far will it go in 3 1/2 hours?
A.FO.06.11	Relate simple linear equations with integer coefficients, e.g., 3x = 8 or x + 5 = 10, to particular contexts and solve.
A.FO.06.14	Solve equations of the form ax + b = c, e.g., 3x + 8 = 15 by hand for positive integer coefficients less than 20, use calculators otherwise, and interpret the results.
N.MR.07.02	Solve problems involving derived quantities such as density, velocity, and weighted averages.
N.FL.07.05	Solve proportion problems using such methods as unit rate, scaling, finding equivalent fractions, and solving the proportion equation a/b = c/d; know how to see patterns about proportional situations in tables.
N.FL.07.07	Solve problems involving operations with integers.
A.PA.07.04	For directly proportional or linear situations, solve applied problems using graphs and equations, e.g., the heights and volume of a container with uniform cross-section; height of water in a tank being filled at a constant rate; degrees Celsius and degrees Fahrenheit; distance and time under constant speed.
A.FO.07.12	Add, subtract, and multiply simple algebraic expressions of the first degree, e.g., (92x + 8y) – 5x + y, or x(x+2) and justify using properties of real numbers.
A.FO.07.13	From applied situations, generate and solve linear equations of the form ax + b = c and ax + b = cx + d, and interpret solutions.
N.MR.08.08	Solve problems involving percent increases and decreases.
N.FL.08.09	Solve problems involving compounded interest or multiple discounts.
N.FL.08.11	Solve problems involving ratio units, such as miles per hour, dollars per pound, or persons per square mile.
A.RP.08.01	Identify and represent linear functions, quadratic functions, and other simple functions including inversely proportional relationships (y = k/x); cubics ($y = ax^3$); roots (y = vx); and exponentials (y = a? , a > 0); using tables, graphs, and equations.
A.FO.08.08	Factor simple quadratic expressions with integer coefficients, e.g., $x^2 + 6x + 9$, $x^2 + 2x – 3$, and $x^2 – 4$; solve simple quadratic equations, e.g., $x^2 = 16$ or $x^2 = 5$ (by taking square roots); $x^2 – x – 6 = 0$, $x^2 – 2x = 15$ (by factoring); verify solutions by evaluation.
A.FO.08.09	Solve applied problems involving simple quadratic equations.
A.FO.08.11	Solve simultaneous linear equations in two variables by graphing, by substitution, and by linear combination; estimate solutions using graphs; include examples with no solutions and infinitely many solutions.
A.FO.08.12	Solve linear inequalities in one and two variables, and graph the solution sets.
A.FO.08.13	Set up and solve applied problems involving simultaneous linear equations and linear inequalities.
G.SR.08.04	Find area and perimeter of complex figures by sub-dividing them into basic shapes (quadrilaterals, triangles, circles).
G.SR.08.05	Solve applied problems involving areas of triangles, quadrilaterals, and circles.

31 Multiply negative numbers.

N.FL.06.09	Add and multiply integers between -10 and 10; subtract and divide integers using the related facts. Use the number line and chip models for addition and subtraction.
N.FL.07.07	Solve problems involving operations with integers.
N.FL.07.08	Add, subtract, multiply, and divide positive and negative rational numbers fluently.
A.FO.07.12	Add, subtract, and multiply simple algebraic expressions of the first degree, e.g., (92x + 8y) – 5x + y, or x(x+2) and justify using properties of real numbers.
N.ME.08.02	Understand meanings for zero and negative integer exponents.
32	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals.
N.ME.05.23	Express ratios in several ways given applied situations, e.g., 3 cups to 5 people, 3:5, 3/5; recognize and find equivalent ratios.
N.ME.06.11	Find equivalent ratios by scaling up or scaling down.
A.PA.06.01	Solve applied problems involving rates, including speed, e.g., if a car is going 50 mph, how far will it go in 3 1/2 hours?
A.RP.06.10	Represent simple relationships between quantities using verbal descriptions, formulas or equations, tables, and graphs, e.g., perimeter-side relationship for a square, distance-time graphs, and conversions such as feet to inches.
D.PR.06.02	Compute probabilities of events from simple experiments with equally likely outcomes, e.g., tossing dice, flipping coins, spinning spinners, by listing all possibilities and finding the fraction that meets given conditions.
N.FL.07.03	Calculate rates of change including speed.
N.MR.07.04	Convert ratio quantities between different systems of units, such as feet per second to miles per hour.
N.FL.07.05	Solve proportion problems using such methods as unit rate, scaling, finding equivalent fractions, and solving the proportion equation a/b = c/d; know how to see patterns about proportional situations in tables.
A.PA.07.04	For directly proportional or linear situations, solve applied problems using graphs and equations, e.g., the heights and volume of a container with uniform cross-section; height of water in a tank being filled at a constant rate; degrees Celsius and degrees Fahrenheit; distance and time under constant speed.
A.FO.07.12	Add, subtract, and multiply simple algebraic expressions of the first degree, e.g., (92x + 8y) – 5x + y, or x(x+2) and justify using properties of real numbers.
33	Add commonly known fractions, decimals, or percentages (e.g., 1/2, .75, 25%).
N.MR.03.20	Recognize that addition and subtraction of fractions with equal denominators can be modeled by joining or taking away segments on the number line.
N.MR.04.27	Add and subtract fractions less than 1 with denominators through 12 and/or 100, in cases where the denominators are equal or when one denominator is a multiple of the other, e.g., 1/12 + 5/12 = 6/12; 1/6 + 5/12 = 7/12; 3/10 - 23/100 = 7/100.
N.MR.04.28	Solve contextual problems involving sums and differences for fractions where one denominator is a multiple of the other (denominators 2 through 12, and 100).
N.MR.04.31	For problems that use addition and subtraction of decimals through hundredths, represent with mathematical statements and solve.
N.FL.04.32	Add and subtract decimals through hundredths.
N.FL.05.14	Add and subtract fractions with unlike denominators through 12 and/or 100, using the common denominator that is the product of the denominators of the 2 fractions, e.g., 3/8 + 7/10 : use 80 as the common denominator.
N.FL.05.18	Use mathematical statements to represent an applied situation involving addition and subtraction of fractions.
N.FL.06.10	Add, subtract, multiply and divide positive rational numbers fluently.
N.FL.07.08	Add, subtract, multiply, and divide positive and negative rational numbers fluently.
34	Add up to three fractions that share a common denominator.
N.MR.04.27	Add and subtract fractions less than 1 with denominators through 12 and/or 100, in cases where the denominators are equal or when one denominator is a multiple of the other, e.g., 1/12 + 5/12 = 6/12; 1/6 + 5/12 = 7/12; 3/10 - 23/100 = 7/100.
N.FL.05.14	Add and subtract fractions with unlike denominators through 12 and/or 100, using the common denominator that is the product of the denominators of the 2 fractions, e.g., 3/8 + 7/10 : use 80 as the common denominator.

35	Multiply a mixed number by a whole number or decimal.	
	N.MR.04.30	Multiply fractions by whole numbers, using repeated addition and area or array models.
	N.FL.04.33	Multiply and divide decimals up to two decimal places by a one-digit whole number where the result is a terminating decimal, e.g., 0.42 ÷ 3 = 0.14, but not 5 ÷ 3 = 1.66666....
	N.MR.05.17	Multiply one-digit and two-digit whole numbers by decimals up to two decimal places.
36	Put the information in the right order before performing calculations.	
	D.RE.04.02	Order a given set of data, find the median, and specify the range of values.
	A.PA.06.09	Solve problems involving linear functions whose input values are integers; write the equation; graph the resulting ordered pairs of integers, e.g., given c chairs, the "leg function" is 4c; if you have 5 chairs, how many legs?; if you have 12 legs, how many chairs?
Level 5		
37	Decide what information, calculations, or unit conversions to use to solve the problem.	
	A.PA.06.09	Solve problems involving linear functions whose input values are integers; write the equation; graph the resulting ordered pairs of integers, e.g., given c chairs, the "leg function" is 4c; if you have 5 chairs, how many legs?; if you have 12 legs, how many chairs?
38	Look up a formula and perform single-step conversions within or between systems of measurement.	
	M.TE.04.06	Know and understand the formulas for perimeter and area of a square and a rectangle; calculate the perimeters and areas of these shapes and combinations of these shapes using the formulas.
	A.RP.06.10	Represent simple relationships between quantities using verbal descriptions, formulas or equations, tables, and graphs, e.g., perimeter-side relationship for a square, distance-time graphs, and conversions such as feet to inches.
	M.TE.06.03	Compute the volume and surface area of cubes and rectangular prisms given the lengths of their sides, using formulas.
	A.PA.08.03	Recognize basic functions in problem context, e.g., area of a circle is pr^2, volume of a sphere is 4/3 pr^3, and represent them using tables, graphs, and formulas.
	A.FO.08.07	Recognize and apply the common formulas: $(a + b)^2 = a^2 + 2ab + b^2$; $(a – b)^2 = a^2 – 2ab + b^2$; $(a + b)(a – b) = a^2 – b^2$; represent geometrically.
	G.SR.08.03	Understand the definition of a circle; know and use the formulas for circumference and area of a circle to solve problems.
	G.SR.08.06	Know the volume formulas for generalized cylinders ((area of base) x height), generalized cones and pyramids (1/3 (area of base) x height), and spheres (4/3 p $(radius)^3$) and apply them to solve problems.
39	Calculate using mixed units (e.g., 3.5 hours and 4 hours 30 minutes).	
	M.PS.02.08	Add and subtract money in mixed units, e.g., $2.50 + 60 cents and $5.75 - $3, but not $2.50 + $3.10.
	M.UN.03.02	Measure in mixed units within the same measurement system for length, weight, and time: feet and inches, meters and centimeters, kilograms and grams, pounds and ounces, liters and milliliters, hours and minutes, minutes and seconds, years and months.
	M.PS.03.10	Add and subtract lengths, weights, and times using mixed units within the same measurement system.
40	Divide negative numbers.	
	N.FL.06.09	Add and multiply integers between -10 and 10; subtract and divide integers using the related facts. Use the number line and chip models for addition and subtraction.
	N.ME.06.18	Understand that rational numbers are quotients of integers (non zero denominators), e.g., a rational number is either a fraction or a negative fraction.
	N.FL.07.07	Solve problems involving operations with integers.
	N.FL.07.08	Add, subtract, multiply, and divide positive and negative rational numbers fluently.
41	Find the best deal using one- and two-step calculations and then comparing results.	
	N.FL.07.03	Calculate rates of change including speed.

	N.FL.08.11	Solve problems involving ratio units, such as miles per hour, dollars per pound, or persons per square mile.
42	Calculate perimeters and areas of basic shapes (rectangles and circles).	
	M.TE.04.06	Know and understand the formulas for perimeter and area of a square and a rectangle; calculate the perimeters and areas of these shapes and combinations of these shapes using the formulas.
	G.SR.08.03	Understand the definition of a circle; know and use the formulas for circumference and area of a circle to solve problems.
	G.SR.08.04	Find area and perimeter of complex figures by sub-dividing them into basic shapes (quadrilaterals, triangles, circles).
	G.SR.08.05	Solve applied problems involving areas of triangles, quadrilaterals, and circles.
43	Calculate percent discounts or markups.	
	N.MR.08.08	Solve problems involving percent increases and decreases.
Level 6		
44	Use fractions, negative numbers, ratios, percentages, or mixed numbers.	
	N.ME.03.19	Understand that any fraction can be written as a sum of unit fractions, e.g., 3/4 = 1/4 + 1/4 + 1/4.
	N.MR.06.01	Understand division of fractions as the inverse of multiplication, e.g., if 4/5 ÷ 2/3 = _, then 2/3 • _ = 4/5 , so _ = 4/5 • 3/2 = 12/10.
	N.ME.06.05	Order rational numbers and place them on the number line.
	N.ME.06.06	Represent rational numbers as fractions or terminating decimals when possible, and translate between these representations.
	N.MR.06.08	Understand integer subtraction as the inverse of integer addition. Understand integer division as the inverse of integer multiplication.
	N.FL.06.10	Add, subtract, multiply and divide positive rational numbers fluently.
	N.MR.06.13	Solve contextual problems involving percentages such as sales taxes and tips.
	N.FL.06.14	For applied situations, estimate the answers to calculations involving operations with rational numbers.
	N.FL.06.15	Solve applied problems that use the four operations with appropriate decimal numbers.
	N.ME.06.17	Locate negative rational numbers (including integers) on the number line; know that numbers and their negatives add to 0, and are on opposite sides and at equal distance from 0 on a number line.
	N.ME.06.18	Understand that rational numbers are quotients of integers (non zero denominators), e.g., a rational number is either a fraction or a negative fraction.
	A.PA.06.01	Solve applied problems involving rates, including speed, e.g., if a car is going 50 mph, how far will it go in 3 1/2 hours?
	N.MR.07.02	Solve problems involving derived quantities such as density, velocity, and weighted averages.
	N.FL.07.05	Solve proportion problems using such methods as unit rate, scaling, finding equivalent fractions, and solving the proportion equation a/b = c/d; know how to see patterns about proportional situations in tables.
	N.FL.07.08	Add, subtract, multiply, and divide positive and negative rational numbers fluently.
	N.FL.07.09	Estimate results of computations with rational numbers.
	A.PA.07.04	For directly proportional or linear situations, solve applied problems using graphs and equations, e.g., the heights and volume of a container with uniform cross-section; height of water in a tank being filled at a constant rate; degrees Celsius and degrees Fahrenheit; distance and time under constant speed.
	N.ME.08.02	Understand meanings for zero and negative integer exponents.
	N.ME.08.03	Understand that in decimal form, rational numbers either terminate or eventually repeat, and that calculators truncate or round repeating decimals; locate rational numbers on the number line; know fraction forms of common repeating decimals, e.g., 0.11111... = 1/9 ; 0.33333... = 1/3 .
	N.MR.08.08	Solve problems involving percent increases and decreases.
	N.FL.08.09	Solve problems involving compounded interest or multiple discounts.

	N.FL.08.11	Solve problems involving ratio units, such as miles per hour, dollars per pound, or persons per square mile.
45	Rearrange a formula before solving a problem.	
	M.TE.04.06	Know and understand the formulas for perimeter and area of a square and a rectangle; calculate the perimeters and areas of these shapes and combinations of these shapes using the formulas.
	M.TE.06.03	Compute the volume and surface area of cubes and rectangular prisms given the lengths of their sides, using formulas.
	A.PA.08.03	Recognize basic functions in problem context, e.g., area of a circle is pr^2, volume of a sphere is 4/3 pr^3, and represent them using tables, graphs, and formulas.
	A.FO.08.07	Recognize and apply the common formulas: $(a + b)^2 = a^2 + 2ab + b^2$; $(a – b)^2 = a^2 – 2ab + b^2$; $(a + b)(a – b) = a^2 – b^2$; represent geometrically.
	G.SR.08.06	Know the volume formulas for generalized cylinders ((area of base) x height), generalized cones and pyramids (1/3 (area of base) x height), and spheres (4/3 p $(radius)^3$) and apply them to solve problems.
46	Use two formulas to change from one unit to another within the same system of measurement.	
	M.UN.05.01	Recognize the equivalence of 1 liter, 1,000 ml and 1,000 cm^3 and include conversions among liters, milliliters, and cubic centimeters.
	M.UN.05.02	Know the units of measure of volume: cubic centimeter, cubic meter, cubic inches, cubic feet, cubic yards, and use their abbreviations (cm^3, m^3, in^3, ft^3, yd^3).
	M.UN.05.04	Convert measurements of length, weight, area, volume, and time within a given system using easily manipulated numbers.
	M.UN.06.01	Convert between basic units of measurement within a single measurement system, e.g., square inches to square feet.
47	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement.	
	M.UN.05.03	Compare the relative sizes of one cubic inch to one cubic foot, and one cubic centimeter to one cubic meter.
48	Find mistakes in questions that belong at Levels 3, 4, and 5.	
	N.FL.05.04	Multiply a multi-digit number by a two-digit number; recognize and be able to explain common computational errors such as not accounting for place value.
49	Find the best deal and use the result for another calculation.	
	N.FL.07.03	Calculate rates of change including speed.
	N.FL.08.11	Solve problems involving ratio units, such as miles per hour, dollars per pound, or persons per square mile.
50	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations.	
	M.TE.04.06	Know and understand the formulas for perimeter and area of a square and a rectangle; calculate the perimeters and areas of these shapes and combinations of these shapes using the formulas.
	M.PS.04.11	Solve contextual problems about surface area.
	M.TE.06.03	Compute the volume and surface area of cubes and rectangular prisms given the lengths of their sides, using formulas.
	G.SR.08.04	Find area and perimeter of complex figures by sub-dividing them into basic shapes (quadrilaterals, triangles, circles).
	G.SR.08.05	Solve applied problems involving areas of triangles, quadrilaterals, and circles.
51	Find the volume of rectangular solids.	
	M.TE.05.09	Use filling (unit cubes or liquid), and counting or measuring to find the volume of a cube and rectangular prism.
	M.PS.05.10	Solve applied problems about the volumes of rectangular prisms using multiplication and division and using the appropriate units.
	M.TE.06.03	Compute the volume and surface area of cubes and rectangular prisms given the lengths of their sides, using formulas.
	N.ME.08.01	Understand the meaning of a square root of a number and its connection to the square whose area is the number; understand the meaning of a cube root and its connection to the volume of a cube.

	G.SR.08.06	Know the volume formulas for generalized cylinders ((area of base) x height), generalized cones and pyramids (1/3 (area of base) x height), and spheres (4/3 p (radius)³) and apply them to solve problems.
52	Calculate multiple rates.	
	N.FL.07.03	Calculate rates of change including speed.
	A.PA.07.04	For directly proportional or linear situations, solve applied problems using graphs and equations, e.g., the heights and volume of a container with uniform cross-section; height of water in a tank being filled at a constant rate; degrees Celsius and degrees Fahrenheit; distance and time under constant speed.
	A.PA.07.05	Recognize and use directly proportional relationships of the form y = mx, and distinguish from linear relationships of the form y = mx + b, b non-zero; understand that in a directly proportional relationship between two quantities one quantity is a constant multiple of the other quantity.
Level 7		
53	Solve problems that include nonlinear functions and/or that involve more than one unknown.	
	A.RP.08.01	Identify and represent linear functions, quadratic functions, and other simple functions including inversely proportional relationships (y = k/x); cubics (y = ax³); roots (y = vx); and exponentials (y = a? , a > 0); using tables, graphs, and equations.
	A.PA.08.02	For basic functions, e.g., simple quadratics, direct and indirect variation, and population growth, describe how changes in one variable affect the others.
	A.PA.08.03	Recognize basic functions in problem context, e.g., area of a circle is pr², volume of a sphere is 4/3 pr³, and represent them using tables, graphs, and formulas.
	A.RP.08.05	Relate quadratic functions in factored form and vertex form to their graphs, and vice versa; in particular, note that solutions of a quadratic equation are the x-intercepts of the corresponding quadratic function.
	A.RP.08.06	Graph factorable quadratic functions, finding where the graph intersects the x-axis and the coordinates of the vertex; use words “parabola” and “roots”; include functions in vertex form and those with leading coefficient –1, e.g., y = x² – 36, y = (x – 2)² – 9; y = – x²; y = – (x – 3)².
	A.FO.08.08	Factor simple quadratic expressions with integer coefficients, e.g., x² + 6x + 9, x² + 2x – 3, and x² – 4; solve simple quadratic equations, e.g., x² = 16 or x² = 5 (by taking square roots); x² – x – 6 = 0, x² – 2x = 15 (by factoring); verify solutions by evaluation.
	A.FO.08.09	Solve applied problems involving simple quadratic equations.
	A.FO.08.11	Solve simultaneous linear equations in two variables by graphing, by substitution, and by linear combination; estimate solutions using graphs; include examples with no solutions and infinitely many solutions.
	A.FO.08.12	Solve linear inequalities in one and two variables, and graph the solution sets.
	A.FO.08.13	Set up and solve applied problems involving simultaneous linear equations and linear inequalities.
	G.LO.08.02	Find the distance between two points on the coordinate plane using the distance formula; recognize that the distance formula is an application of the Pythagorean Theorem.
54	Find mistakes in Level 6 questions.	
55	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages.	
	M.UN.03.01	Know and use common units of measurements in length, weight, and time.
	M.UN.05.04	Convert measurements of length, weight, area, volume, and time within a given system using easily manipulated numbers.
56	Calculate multiple areas and volumes of spheres, cylinders, or cones.	
	M.PS.03.13	Solve contextual problems about perimeters of rectangles and areas of rectangular regions.
	M.TE.04.06	Know and understand the formulas for perimeter and area of a square and a rectangle; calculate the perimeters and areas of these shapes and combinations of these shapes using the formulas.
	M.PS.05.05	Represent relationships between areas of rectangles, triangles, and parallelograms using models.

	M.TE.05.08	Build solids with unit cubes and state their volumes.
	M.PS.05.10	Solve applied problems about the volumes of rectangular prisms using multiplication and division and using the appropriate units.
	G.TR.07.06	Understand and use the fact that when two triangles are similar with scale factor of r, their areas are related by a factor of r^2.
	A.PA.08.03	Recognize basic functions in problem context, e.g., area of a circle is pr^2, volume of a sphere is 4/3 pr^3, and represent them using tables, graphs, and formulas.
	G.GS.08.01	Understand at least one proof of the Pythagorean Theorem; use the Pythagorean Theorem and its converse to solve applied problems including perimeter, area, and volume problems.
	G.LO.08.02	Find the distance between two points on the coordinate plane using the distance formula; recognize that the distance formula is an application of the Pythagorean Theorem.
	G.SR.08.03	Understand the definition of a circle; know and use the formulas for circumference and area of a circle to solve problems.
	G.SR.08.04	Find area and perimeter of complex figures by sub-dividing them into basic shapes (quadrilaterals, triangles, circles).
	G.SR.08.05	Solve applied problems involving areas of triangles, quadrilaterals, and circles.
	G.SR.08.06	Know the volume formulas for generalized cylinders ((area of base) x height), generalized cones and pyramids (1/3 (area of base) x height), and spheres (4/3 p $(radius)^3$) and apply them to solve problems.
	G.SR.08.07	Understand the concept of surface area, and find the surface area of prisms, cones, spheres, pyramids, and cylinders.
	G.TR.08.10	Understand and use reflective and rotational symmetries of two-dimensional shapes and relate them to transformations to solve problems.
57	Set up and manipulate complex ratios or proportions.	
	M.PS.03.12	Solve applied problems involving money, length, and time.
	N.ME.05.23	Express ratios in several ways given applied situations, e.g., 3 cups to 5 people, 3:5, 3/5; recognize and find equivalent ratios.
	N.ME.06.11	Find equivalent ratios by scaling up or scaling down.
	A.PA.06.01	Solve applied problems involving rates, including speed, e.g., if a car is going 50 mph, how far will it go in 3 1/2 hours?
	N.MR.07.02	Solve problems involving derived quantities such as density, velocity, and weighted averages.
	N.FL.07.05	Solve proportion problems using such methods as unit rate, scaling, finding equivalent fractions, and solving the proportion equation a/b = c/d; know how to see patterns about proportional situations in tables.
	A.PA.07.04	For directly proportional or linear situations, solve applied problems using graphs and equations, e.g., the heights and volume of a container with uniform cross-section; height of water in a tank being filled at a constant rate; degrees Celsius and degrees Fahrenheit; distance and time under constant speed.
	G.TR.07.06	Understand and use the fact that when two triangles are similar with scale factor of r, their areas are related by a factor of r^2.
	N.FL.08.09	Solve problems involving compounded interest or multiple discounts.
	N.FL.08.11	Solve problems involving ratio units, such as miles per hour, dollars per pound, or persons per square mile.
58	Find the best deal when there are several choices.	
	M.PS.03.12	Solve applied problems involving money, length, and time.
59	Apply basic statistical concepts.	
	D.RE.03.03	Solve problems using information in bar graphs, including comparison of bar graphs.
	D.RE.04.02	Order a given set of data, find the median, and specify the range of values.
	D.RE.04.03	Solve problems using data presented in tables and bar graphs, e.g., compare data represented in two bar graphs and read bar graphs showing two data sets.
	D.AN.05.04	Solve multi-step problems involving means.

D.PR.06.02	Compute probabilities of events from simple experiments with equally likely outcomes, e.g., tossing dice, flipping coins, spinning spinners, by listing all possibilities and finding the fraction that meets given conditions.
G.TR.07.03	Understand that in similar polygons, corresponding angles are congruent and the ratios of corresponding sides are equal; understand the concepts of similar figures and scale factor.

LOCATING INFORMATION

Level 3

60 Find one or two pieces of information in a graphic.
61 Fill in one or two pieces of information that are missing from a graphic.

Level 4

62 Find several pieces of information in one or two graphics.
63 Understand how graphics are related to each other.
64 Summarize information from one or two straightforward graphics.
65 Identify trends shown in one or two straightforward graphics.
66 Compare information and trends shown in one or two straightforward graphics.

Level 5

67 Sort through distracting information.
68 Summarize information from one or more detailed graphics.
69 Identify trends shown in one or more detailed or complicated graphics.
70 Compare information and trends from one or more complicated graphics.

Level 6

71 Draw conclusions based on one complicated graphic or several related graphics.
72 Apply information from one or more complicated graphics to specific situations.
73 Use the information to make decisions.

APPLIED TECHNOLOGY

Level 3

74 Identify how basic tools work.
75 Identify how simple machine parts work.
76 Apply basic principles to solve problems involving a simple system.
77 Solve basic problems.
78 Identify the clear physical symptom that points to the potential source of a problem.
79 Identify the best solution after eliminating clearly unsuitable possibilities.

Level 4

80 Understand the operation of moderately complex tools and diagnostic equipment.
81 Understand the operation of moderately complex machines and systems.
82 Apply less obvious basic principles to solve problems within physical systems.
83 Solve moderate problems.
84 Eliminate physical symptoms that do not point to the source of a problem, disregarding extraneous information.
85 Identify the best solution after eliminating other unsuitable possibilities.

Level 5

86 Understand the operation of moderately complex tools and diagnostic equipment, choosing the best tool for the task.
87 Understand the operation of complex machines and systems.
88 Apply two or more principles of technology as they interact in moderately complex systems.
89 Solve moderate and advanced problems.
90 Eliminate physical symptoms that do not lead to the source of a problem by disregarding extraneous information; use clues to find the source of a problem.
91 Identify the best solution after eliminating other unsuitable possibilities.

Level 6

92 Understand the operation of complex tools and diagnostic equipment, choosing the best tool for the task.
93 Understand the operation of complex machines and their components.
94 Apply two or more principles of technology as they interact in complex systems.

95 Solve advanced problems where a variety of mechanical, electrical, thermal, or fluid faults could be the reason for the problem.
96 Eliminate physical symptoms that do not lead to the source of a problem by disregarding extraneous information; use less obvious clues to find the source of a problem.
97 Test possible hypotheses to ensure the problem is diagnosed correctly and the best solution is found.

WRITING

Level 1

Level 2

98 Use correct sentence structures.
99 Convey an idea in a generally understandable fashion.
100 Use topical information.

Level 3

101 Write clearly.
102 Use complete sentences.
103 Write with few mechanical, grammatical, and/or word usage errors.
104 Avoid slang and rude language.
105 Demonstrate organization.

Level 4

106 Write with almost no errors.
107 Use professional tone consistent with standard business English.
108 Demonstrate adequate style.
109 Demonstrate good organization.

Level 5

110 Write with no errors.
111 Use correct, complete sentences with variety, smoothness, and polish.
112 Write with no mechanical, grammatical, or word usage errors.
113 Use businesslike, professional, courteous tone in standard business English.
114 Write with style that flows smoothly.
115 Demonstrate good organization with smooth transition and logical order.

BUSINESS WRITING

Level 1

116 Write in English.
117 Communicate an idea.

Level 2

118 Write with few mechanical, grammatical, and/or word usage errors.
119 Use correct sentence structure.
120 Convey an idea understandably.
121 Demonstrate organization.

Level 3

122 Write clearly.
123 Use complete sentences attempting variety and complexity.
124 Spell correctly.
125 Use style and tone consistent with standard business English.
126 Demonstrate simple transitions.
127 Develop ideas.

Level 4

128 Use complete sentences with variety and complexity.
129 Use words precisely with variety.
130 Organize with consistent focus.
131 Use effective transitions.
132 Develop ideas with relevant supporting examples and details.

Level 5

133 Write clearly and precisely, generally free of errors.
134 Communicate in a professional and courteous manner.
135 Demonstrate smooth organization with clear and consistent focus from beginning to end.

136 Use transitions which are varied and effective, creating a seamles flow of ideas.
137 Demonstrate insight, perception, and depth, in writing.

LISTENING

Level 1

138 Identify at least one piece of primary information.
139 Identify clues to sources of additional information.
140 Identify general sketch of situation.

Level 2

141 Correctly identify more than one piece of primary information.
142 Sketch the given situation.
143 Identify the gist of the situation.
144 Identify sources of further information.

Level 3

145 Identify most primary information.
146 Demonstrate the relationships among the pieces of primary information to take further action without additional information.

Level 4

147 Identify all primary information.
148 Identify supporting information to not interfere with central message.

Level 5

149 Demonstrate insight into situation through supporting information, including tone and attitude.
150 Demonstrate the relationships among the pieces of information in the message.

OBSERVATION

Level 3

151 Remember a few strongly prompted details.
152 Pay attention to the basic parts of a straightforward procedure.
153 Remain aware of instructions and reminders that give strong cues.
154 Concentrate on the important elements of a procedure.

Level 4

155 Select and pay attention to the components of a straightforward procedure with some details that are hard to notice.
156 Remember a few important details that are reinforced.
157 Remain focused on relevant details when there are some extra details or distractions.

Level 5

158 Focus attention on and remember several important details from a complex set of events that may occur at the same time.
159 Maintain attention to significant details with little prompting.
160 Remember relevant aspects of the information presented.
161 Remember several important details about unique material.
162 Ignore irrelevant background information or distractions and pay attention only to important points.

Level 6

163 Recognize a number of steps that are presented at the same time.
164 Notice and remember several details that are relevant to the procedure.
165 Visualize how a step fits into the procedure even if there are not many hints or reminders.
166 Disregard irrelevant information.
167 Interpret if-then and cause-and-effect relationships that affect tasks.
168 Make predictions, comparisons, and evaluations.

TEAMWORK

Level 3

169 Recognize team goals.
170 Show acceptance of team goals by working cooperatively with other team members.
171 Identify problems and their causes.
172 Persevere in solving problems.
173 Accept membership in the team.

174 Demonstrate a positive attitude, respond appropriately to praise, and give positive feedback.
175 Display trust in other team members.
176 Be dependable in completing tasks correctly and on time.

Level 4

177 Use prioritization and time management skills to effectively and efficiently accomplish tasks.
178 Exhibit creative thinking when solving problems or accomplishing tasks.
179 Show a commitment to quality.
180 Show sensitivity to customer needs.
181 Practice followership by taking direction and responding appropriately to negative feedback.
182 Demonstrate respect for other team members.
183 Show an appreciation for diversity among team members.

Level 5

184 Exhibit good decision-making and analyzing skills.
185 Delegate responsibility.
186 Show leadership by both assuming the directive role and giving that role to others.
187 Empower other team members.
188 Display initiative.
189 Be properly assertive in explaining personal convictions honestly and with sincerity.

Level 6

190 Perform structuring and process planning by organizing the various parts of a problem or task, sequencing them, and determining who will be responsible for them.
191 Create and revise team goals by shifting from one objective to another, depending on circumstances.
192 Integrate or synthesize multiple task components into a coherent whole.
193 Be flexible in the roles they play on the team using active listening, questioning, and directive behaviors.
194 Resolve conflict among team members and give negative feedback in a constructive manner.